

Abstract of Proceedings: Connecticut Valley Branch, Society of Amer. Bacter.

1946 Spring Meeting, Smith College, Northampton, Mass.

May 4, 1946.

Reprinted from Jour. Bact., 52:503. 1946.

Studies in Bacterial Genetics. Joshua Lederberg, Childs Memorial Fellow in Medical Research, Osborn Botanical Laboratory, Yale University, New Haven, Conn.

1. Auxanography. A method for the identification of the nutritional requirements of biochemical mutants in bacteria is described. A modification of Beijerinck's 'auxanographic method', it consists of suspending 10^4 to 10^7 washed cells in a minimal agar plate, incubating for 3 to 6 hours, and then placing small drops of various growth factors on the surface at various points. A stimulatory response is a turbid zone appearing in 2 to 24 hours. The procedure need not be aseptic. The advantages of this technique are: a) substances difficult to sterilize can be tested, b) a specific growth response is distinguished from a back mutation to wild type, as the latter appears as discrete colonies, c) since there is a gradient in concentration from the drop, all levels are tested, and possible inhibitory effects at certain doses do not mask the response. Several unstable nutritional mutants of *E. coli* have been characterized by this method.

2. Syntrophism. This is defined as the growth of two distinct biochemical mutants in mixed culture as the result of the ability of each strain to synthesize the growth factor required by the other. It has been found that media whose growth factor content severely limits the growth of the individual mutants will support the optimal growth of a mixed culture of two of them. Mutants blocked at different steps in the synthesis of the same factor show syntrophism, presumably by the exchange of precursors. By counting the colonies that appear on plating into different media the composition of the culture in terms of the different mutants can be determined. (This tends to be constant for a given combination. In some cultures, wild type cells are occasionally found. These probably arise by back-mutation, but might result from a sexual fusion or from a transformation such as has been described in pneumococcus. This phenomenon is being investigated further.)*

* The matter in parenthesis was inadvertently omitted from the printed copy.